

CLAIMS

What is claimed is:

1. A method of processing a signal comprising the steps of:

- 5           a) reading a first bit section from a bit stream of variable length codes beginning at a reference bit of said bit stream;
- b) reading a second bit section from said bit stream beginning at a first offset from said reference bit of said bit stream, wherein steps a) and b) are done in parallel;
- 10          c) indexing a table with said first bit section to obtain a first look-up result, said table comprising a plurality of variable length codes and a corresponding plurality of code lengths, said first look-up result describing the length of a first symbol in said bit stream;
- d) indexing said table with said second bit section to obtain a second look-  
15          up result, wherein steps c) and d) are done in parallel;
- e) determining if said second look-up result from step d) is valid; and
- f) accepting said second look-up result if it is valid, wherein said second look-up result describes a second symbol length in said bit stream.

20    2.     The method of Claim 1 further comprising the steps of:

- g) advancing the reference bit of said bit stream by the sum of said first and second symbol lengths; and
- h) repeating steps a) through f).

3. The method of Claim 1 further comprising the steps of:

g) reading a third bit section from said bit stream beginning at a second offset from said reference bit of said bit stream, wherein step a), step b), and step g) are done in parallel;

5 h) indexing said table with said third bit section to obtain a third look-up result, wherein step c), step d), and step h) are done in parallel; and

i) determining whether said third look-up result from step h) is valid.

4. The method of Claim 1, wherein said first offset is equal to the minimum-code length of codes in said table.

5. The method of Claim 2 wherein said second offset is one bit greater than said first offset.

6. The method of Claim 1 wherein said bit stream comprises digital video data.

7. The method of Claim 1 wherein said bit stream comprises data in MPEG format.

8. The method of Claim 1 wherein said bit stream comprises data encoded with Huffman coding.

9. A method of processing a signal using single instruction multiple data (SIMD) instruction set, said method comprising the steps of:

a) reading a first bit section from a first block of a video segment starting at a first reference bit;

b) reading a second bit section from a second block of said video segment starting at a second reference bit, wherein steps a) and b) are performed with a

5 first SIMD instruction;

c) indexing a table of variable length codes with said first bit section to obtain a first look-up result;

d) indexing said table of variable length codes with said second bit section to obtain a second look-up result, wherein steps c) and d) are performed with a

10 second SIMD instruction;

e) based on said first look-up result, advancing said first reference bit;

f) based on said second look-up result, advancing said second reference bit, wherein steps e) and f) are performed with a third SIMD instruction; and

g) repeating steps a) through f).

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10. The method of Claim 9 further comprising the steps of:

h) performing steps a) through f) by executing a plurality of SIMD instructions in parallel on a plurality of arithmetic logic units (ALUs).

20 11. The method of Claim 10 wherein all blocks in a digital video (DV) segment are decoded in parallel.

12. The method of Claim 9 wherein said data is in MPEG format.

13. A computer-readable medium having stored thereon instructions for causing a computer system to decode a digital video signal, said instructions causing the computer system to carry out the steps of:

- a) reading a plurality of bit sections from a bit stream, said bit stream having  
5 a plurality of symbols of varying lengths;
- b) indexing a table of variable length codes with said plurality of bit sections from said bit stream to obtain a look-up result for each of said bit sections, wherein said indexing is done in parallel;
- c) determining whether each of said look-up results from step b) is valid;
- 10 and
- d) accepting valid look-up results.

14. The method of Claim 13 further comprising the step of:

- e) advancing said bit stream by the sum of the symbol lengths of all  
15 accepted look-up results from step d); and
- f) repeating steps a) - e).

15. The method of Claim 13, wherein steps a) and c) comprise the steps of:

- a1) reading said plurality of bit sections from said bit stream, said plurality of  
20 bit sections each having a reference bit, said bit stream having a plurality of symbols each symbol having a reference bit; and
- c1) determining that one of said look-up results from step b) is valid if the reference bit of one of said bit sections in said bit stream is the same bit as a reference bit of one of said symbols in said bit stream.

16. The method of Claim 13 wherein said plurality of bit sections comprises a first, a second, and a third;

said first bit section having its reference bit the same as the reference bit of

5 one of said symbols;

said second bit section having its reference bit offset a number of bits equal to the minimum code length past said reference bit of said first bit section; and

said third bit section having its reference bit offset one bit past said reference bit of said second bit section.

10 17. The method of Claim 13 wherein said bit stream is encoded via Huffman encoding.

18. The method of Claim 13 wherein said bit stream comprises digital video data.

19. The method of Claim 13 wherein said bit stream comprises MPEG data.

20. In a decoder for decoding a digital input signal, a software implemented

20 method of performing variable length decoding comprising the steps of:

a) accessing a plurality of bit sections from said digital input signal;

b) in parallel, accessing a variable length encoded table with said plurality of bit sections to obtain a respective bit length for each bit section;

c) based on a bit length for a first bit section of said plurality of bit sections, determining if any other bit sections of said plurality of bit sections are valid and access bit lengths for any valid bit sections;

d) determining a sum of said bit length of said first bit section with said bit

5 lengths for said any valid bit sections;

e) advancing through said digital input signal by said sum; and

f) repeating steps a) - e).

21. The method of Claim 20 wherein said digital input signal comprises digital  
10 video data.

22. The method of Claim 20 wherein said digital input signal comprises data in  
MPEG format.